



W I L H E L M F A R M F A C T S H E E T

Windbreaks on Wilhelm Farm

Purposes of Windbreaks

Sarah Workman (2012) advises: A major key to a successful windbreak is recognizing what you want it to do on your land. The next step is to understand how a successful windbreak works and what makes a good design. The final step is planting the kinds of trees and shrubs in the windbreak that will make it work for you.

The advantages of windbreaks include:

- Protect structures (homes, buildings, roads)
- Capture water runoff and nutrients
- Improve irrigation efficiency
- Visual screen
- Filter and reduce dust
- Help control odors
- Provide wildlife corridors & habitat
- Decrease noise
- Improve attractiveness
- Improve yields
- Protect soil from wind erosion
- Shelter livestock and crop

New Wilhelm Farm windbreaks will provide protection of home and driveway, and there is considerable future potential for sheltering livestock during the winter months. We do not plan on any windbreaks to shelter vegetable, berry or fruit crops. As Miller notes:

When talking in general about windbreaks ... remember that they are not planted extensively in the Northeast because the combination of wind shelter (reduced ventilation) and the humid climate encourages high levels of fungal diseases in the sheltered [crop and garden] vegetation.¹

History of Windbreaks in US

There is an American tradition of utilizing windbreaks in farming dating back to pre-colonial Native Americans. These same techniques were used by early Colonists, especially in Appalachia. More recently, in response to the Dustbowl crisis in the 1930s, windbreaks were planted across the Prairie States to protect soil and water resources from wind erosion. Research began in USDA agencies and land grant universities throughout the Midwest to develop a foundation for improving these practices.

Stoeckeler and Williams (1949) documented that:

Experience with systematic plantings of shelterbelts to protect fields goes back to 1789, when a group of German Mennonites, who emigrated to the Russian Steppes, began the

¹ Review comment by Professor Emeritus David Miller, University of Connecticut, on August 15, 2018, on a draft of this Factsheet.

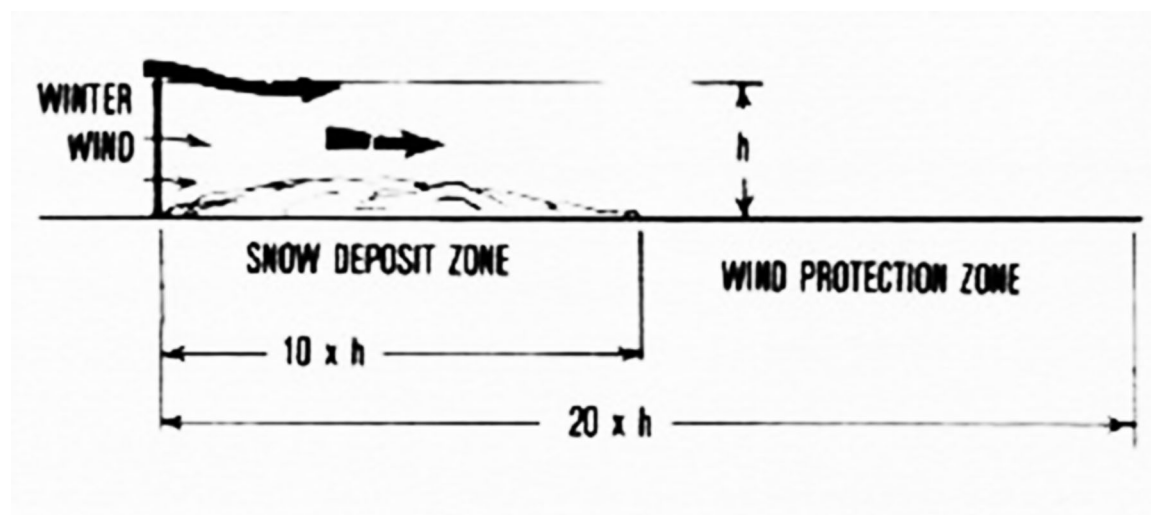
shelterbelts that since have been extended to thousands of miles. The term "shelterbelt" was used as early as 1833, so it is apparent that some thought for controlling wind erosion by use of trees was in existence over a century ago. We have records of some of these plantings in Nebraska Territory as early as 1854.... J. Sterling Morton, third Secretary of Agriculture, founded Arbor Day and saw its first official celebration in his home State of Nebraska in 1872.

They continue with: *The Prairie States Forestry Program (PSFP) was initiated in 1935 to combat severe soil erosion from the Dust Bowl years. Over the course of the next 7 years, the U.S. Forest Service, working with the Works Progress Administration and the Civilian Conservation Corps, planted nearly 220 million seedlings in the Great Plains.*

Williams (2005) documents that: *These plantings, known as windbreaks or shelterbelts, created 18,600 miles of linear strips of trees from North Dakota through Texas. Windbreaks play an important role on the landscape in the plains region – [they] enhance crop production, protect structures and livestock, and benefit soil and water conservation.... Analysis found that 38% of the original windbreak locations were still intact, with 40% partially intact and 22% no longer in existence.*

Basic Design Elements

Our windbreak need is to protect from drifting snow, which generally comes from the north (diagram from Jones, et al, 1983). Vegetation is used to lift the wind, which causes the snow to drop to the ground. The snow deposit zone is 10 times the height of the vegetation. For example, a 3-foot high windbreak would drop the snow in a 30-foot-wide zone and provide some wind protection of up to 60 feet.



Wilhelm Farm windbreak needs

Wilhelm Farm has two immediate windbreak needs to mitigate drifting snow:

1. North side on home.

In 2003, the house was rebuilt, expanded and insulated, except for the north wall. That wall was opened to the studs in 2016, the old insulation (1911 Swedish newspapers printed in Chicago) removed, and Tyvek and fiberglass insulation installed. New thermopane windows were added as well.

Our next step is to design and install a vegetative windbreak to stop snow from drifting against the north wall, the back deck and the garage. Because the master bedroom has a beautiful view over the north hayfield, a small orchard and the woods beyond, we want the design to be low and add to the view, not block it.



The north wall of the farmhouse (left) was renovated and fully insulated two years ago, including installation of thermopane windows. A windbreak will help by dropping snow from the north before the deck and garage wall. The design uses 3 rows of plants that are kept at 3 feet in height to protect the beautiful viewscape (right). A row of mountain laurel closets to the house would add colorful flowers in the spring. The illustration below gives an idea of the layout of the windbreak.



David Miller, a professor emeritus at UConn with considerable experience with windbreaks, advised us to install a *Green Wall* (a band of coniferous trees) about 20 feet from the house and deck. We will use eastern red cedar planted in 3 rows on 3-foot centers in a strip that runs from a planted cedar and pawpaw trees to the septic tank. We will keep the cedar trimmed at 3 feet. This *Green Wall* will cause the wind to rise and the snow will drop out before reaching the house, deck or garage. An alternative under consideration is mountain laurel in the row closest to the house, which would add an attractive spring flowering species to the immediate viewscape.

Eastern Red Cedar makes an effective hedge and windbreak. We will begin planting in September 2018 and fertilize with super phosphate to encourage root development before winter. In the spring, we will replace any seedlings that do not make it through the winter and add a bit more super phosphate. We anticipate observing some results by 2021 and full results by 2024.



2. Driveway from home to highway

The house, barn and other outbuildings are at the top of a hill from the highway. Winter brings problems with ice at the top and steepest part of the driveway and drifting snow causes navigation problems over the bottom half of the driveway.



Snow drifts from the north (left) on to portion drive that is sunlit. The windbreak will be about 20 feet to the north, dropping the snow in the belt before the driveway. This snow will add moisture for dwarf fruit trees, berry bushes, and flowers planted in the belt south (right) of the windbreak. The portion of the drive that is shaded tends to ice over as snow melts or is tracked uphill by vehicles. Eventually, the solution is removing three tall spruce trees that block the winter sun from the south. The illustration gives an idea of the layout of the windbreak.

The solution recommended by Miller is a *Green Wall* located 20 feet north of the drive. Eastern Red cedar is the recommended planting stock. A 3-row system with a height of 4 feet would cause the generally heavy, wet snow from the north to drop the driveway. Planting berry bushes, flowering dwarf fruit trees, and perennial flowers in the strip between the drive and cedar windbreak will add to the aesthetics of the farm and benefit from soil moisture as the snow melts.



Map of planned new windbreaks on north side of home and north of driveway. The driveway and parking area are highlighted white. The green dots are 2-3 rows of eastern red cedar planted on 3-foot centers with the second row offset from the first. The cedar will be pruned at 3 to 4 feet tall to preserve viewscape and prevent lifting snow too high and distributing it to the south of the target area. The yellow and pink dots to the south of the windbreaks are mixes of mountain laurel (north of house), dwarf fruit trees, berry bushes and flowers that benefit from the moisture from melting snow drafts.

Future needs and relationships to silvopasture unit

Possible future windbreak needs include expanding windbreak protection around the barn yard for livestock (goats, chickens, possibly eventually cattle). Also, if we want to expand our areas of fruit trees and berry bushes in the future, some windbreak protection will increase yields.²

Our silvopasture unit has windbreak traits. It provides shade for livestock in the warm days of summer and shelter from wind and cold during the late fall and early spring.

Follow-up

Results from implementation of our windbreak plans will be posted on our webpage – <http://www.WilhelmFarm.com>.

² Given the labor demands of these crops, potential expansion will not be implemented until the next generation assumes management for Wilhelm Farm or a new owner takes control.

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